

Kennesaw State University

DigitalCommons@Kennesaw State University

Symposium of Student Scholars

26th Annual Symposium of Student Scholars -
2022

Detection of Trace Heavy Metals in Water: Development of Electrochemical Sensors


Quang Lam

Kennesaw State University

Joel Mututeke

Kennesaw State University

Follow this and additional works at: <https://digitalcommons.kennesaw.edu/undergradsymposiumksu>

 Part of the [Mechanical Engineering Commons](#), [Nanoscience and Nanotechnology Commons](#), [Other Materials Science and Engineering Commons](#), and the [Polymer and Organic Materials Commons](#)

Lam, Quang and Mututeke, Joel, "Detection of Trace Heavy Metals in Water: Development of Electrochemical Sensors" (2022). *Symposium of Student Scholars*. 258.

<https://digitalcommons.kennesaw.edu/undergradsymposiumksu/spring2022/presentations/258>

This Poster is brought to you for free and open access by the Office of Undergraduate Research at DigitalCommons@Kennesaw State University. It has been accepted for inclusion in Symposium of Student Scholars by an authorized administrator of DigitalCommons@Kennesaw State University. For more information, please contact digitalcommons@kennesaw.edu.

Detection of Trace Heavy Metals in Water: Development of Electrochemical Sensors

Quang Lam¹, Joel Mututeke¹, Duy Pham¹, Mohammed Elkholy¹, Steven Lewis¹ and Ashish Aphale^{1*}

¹ Department of Mechanical Engineering, Kennesaw State University, Marietta, GA

Abstract

The presence of heavy metals in our ecosystem poses significant ecological and physiological consequences. As a result, numerous techniques are developed for the detection of contaminants in aqueous solutions. However, early and trace detection of such contaminants still remains a challenge. Amongst many techniques, electrochemistry driven sensors have shown promise due to their possibility of miniaturization and low-cost. Our research investigates the use of electrically conducting polymer and atomically thin carbon materials as electrodes towards the development of electrochemical sensor. Nanocomposite electrode films have been synthesized and fabricated using in-situ polymerization technique and the relationship between number of cycles of deposition and its electrochemical performance is analyzed. Capacitive microcomb sensor device has been fabricated. Understanding of device performance using electrochemical, chemical, and morphological tests on electrodes will be conducted and generation of ohmic and non-ohmic resistance as a function of deposition, electrolyte solutions will be highlighted. Future work on fabrication of nanofibers using electrospinning and selective deposition on sensor platform will also be discussed.